

ORIGINAL

BEFORE THE  
**Federal Communications Commission**

WASHINGTON, D.C. 20554

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FEDERAL COMMUNICATIONS COMMISSION  
 OFFICE OF THE SECRETARY

In the Matter of )

Revision of Part 15 of the Commission's Rules )

Regarding Ultra-Wideband Transmission Systems )

ET Docket No. 98-153

To: The Commission

**REPLY COMMENTS OF LOCKHEED MARTIN CORPORATION**

Lockheed Martin Corporation ("Lockheed Martin"), pursuant to Section 1.415 of the Commission's rules (47 C.F.R. § 1.415), submits these reply comments regarding the Commission's Notice of Proposed Rule Making ("NPRM") in the above-captioned docket. The Commission has sought public input with respect to its proposal to modify Part 15 of its Rules in order to facilitate operation of various applications employing ultra-wideband ("UWB") technology. In response, Lockheed Martin and approximately 130 other parties have filed comments responding to the Commission's initiative, many urging the Commission to alter its course to ensure that any implementation of UWB applications does not disrupt existing telecommunications and other radio services.

In its comments, Lockheed Martin urged the Commission to proceed cautiously in its capacity as national spectrum manager and to require technical proof that all UWB applications that are ultimately authorized are capable of operating without

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causing interference to existing radio spectrum users,<sup>1</sup> while it also concurred that UWB applications offer potential public interest benefits when deployed in a manner that does not interfere with existing users.<sup>2</sup> A wide variety of parties from all areas of the telecommunications industry have joined with Lockheed Martin in urging such thorough testing before any further UWB applications are authorized. The services represented by these comments include the Global Positioning System (“GPS”),<sup>3</sup> Personal Communications Services and cellular radio services in the 1-2.6 GHz bands,<sup>4</sup> broadcast radio and television services and associated electronic news gathering frequency bands at 1.990-2.110 GHz,<sup>5</sup> the Satellite Digital Audio Radio Service in the 2320-2345 MHz bands,<sup>6</sup> high speed Internet services utilizing the Multichannel Multipoint Distribution Service (“MMDS”) and Instructional Television Fixed Service (“ITFS”) frequency bands at 2150-2162 MHz and 2500-2690 MHz,<sup>7</sup> the Mobile Satellite Service in the 2483.5-2500

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<sup>1</sup> See Comments of Lockheed Martin at 1.

<sup>2</sup> See Letter from Gerald Musarra, Vice President, Trade and Regulatory Affairs, Lockheed Martin, to Magalie R. Salas, Secretary, FCC, dated September 22, 2000.

<sup>3</sup> See Comments of U.S. GPS Industry Council (“GPS Council”); Comments of Aeronautical Radio, Inc. and the Air Transport Association of America, Inc.; Comments of the Aircraft Owners and Pilots Association (“AOPA”); Comments of The Boeing Company; Comments of Carnegie-Mellon University; Comments of GARMIN International, Inc.; Comments of QUALCOMM Incorporated; Comments of Rockwell Collins, Inc. (“Rockwell Collins”); Comments of the Satellite Industry Association; Comments of SiRF Technology, Inc.; Comments of Stanford University (“Stanford”); Comments of the United States Department of Transportation and Comments of Lockheed Martin Corporation.

<sup>4</sup> See Comments of AT&T Wireless Services, Inc. and Nortel Networks, Inc.

<sup>5</sup> See Comments of The National Association of Broadcasters.

<sup>6</sup> See Comments of XM Radio, Inc. (“XM Radio”), and Sirius Satellite Radio, Inc. (“Sirius”).

<sup>7</sup> See Comments of Cisco Systems, Inc. (“Cisco”).

MHz and 2 GHz bands,<sup>8</sup> manufacturers of aeronautical telemetry equipment above 4 GHz,<sup>9</sup> and wireless communications service providers in the 2.3 GHz band.<sup>10</sup>

In view of these concerns by such a broad cross-section of the communications industry, Lockheed Martin continues to believe that it would be inappropriate for the Commission to make final determinations regarding the substantial issues that it faces based solely on the initial data that the agency is expected to receive beginning next week. Because of the many types of UWB applications that are under consideration, and the lack of a single waveform that is valid for all, multiple testing trials must be completed. Accordingly, a single submission of data will not be adequate to consider the large number of variables associated with introduction of UWB transmissions into the current “frequency domain” environment. Other parties agree that the Commission must allow more time to obtain research data, to analyze it thoroughly, and to conduct any necessary follow-up tests that may be suggested by the initial data.<sup>11</sup> Among the most critical and substantial issues advanced by the commenters are the substantial differences in the interference potential of devices that employ continuous waves, as opposed to those that use intermittent pulses,<sup>12</sup> as well as the issue of

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<sup>8</sup> See Comments of Mobile Communications Holdings, Inc. (“MCHI”) and QUALCOMM Incorporated.

<sup>9</sup> See Rockwell Collins Comments.

<sup>10</sup> See Comments of Metricom, Inc. (“Metricom”).

<sup>11</sup> See, e.g., AOPA Comments at 1-4; Metricom Comments at 6-7; Rockwell Collins Comments at 3-5; Stanford Comments at 1-2; GPS Council Comments at 35-37; XM Radio Comments at 12-13.

<sup>12</sup> See Cisco Comments at 4, and GPS Council Comments at 47.

cumulative interference from large numbers of UWB devices,<sup>13</sup> which is not even an element of the major testing programs now in progress.

A significant number of the commenters note specifically that the sensitive nature of operations in frequency bands used for military and public safety applications (*e.g.*, GPS), as well as other operations requiring sensitive signal discrimination for omnidirectional antennas, justifies special measures to ensure that these services are protected from harm. Commenters have highlighted the fact that the Commission's proposal to restrict UWB operations below 2 GHz would not adequately protect all of these services, and that a more appropriate cut-off point would be closer to 3 GHz in order to include more of the especially vulnerable bands,<sup>14</sup> including frequencies that are restricted from unlicensed Part 15 use.<sup>15</sup> Even UWB proponent, Multispectral Solutions, Inc. ("MSSI") advocates a cut-off at 3.1 GHz.<sup>16</sup> It may therefore be appropriate for the Commission to adjust its thinking on the cut-off point, although the final point established should be based on the results of the ongoing experimental trials. At a minimum, however, the comments filed thus far make a strong case for moving the general cut-off to 3 GHz, and for ensuring that unwanted emissions from devices operating above the selected demarcation are sufficiently attenuated to avoid harmful interference to GPS and other services operating in these bands. Such an approach will meet the Commission's objective of protecting existing services without unduly constraining the development and deployment of new forms of UWB technology.

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<sup>13</sup> See, *e.g.*, Rockwell Collins Comments at 6; GPS Council Comments at 33-35.

<sup>14</sup> See, *e.g.*, MCHI Comments at 4; Sirius Comments at 11; XM Radio at 10.

<sup>15</sup> See 47 C.F.R. § 15.205(a).

<sup>16</sup> See Comments of Multispectral Solutions, Inc. ("MSSI") at 2, 13.

Finally, Lockheed Martin shares the view with many of the other initial commenters,<sup>17</sup> including at least one UWB proponent,<sup>18</sup> that full consideration of the technical data may lead to the conclusion that the interference characteristics of UWB make many of its applications ill-suited for unlicensed operation under Part 15 of its rules. Given the potential consequences of interference into frequency bands used for public safety applications, for terrestrial and satellite communications services, and for wireless IT backbone, the Commission must establish a regulatory regime that allows it to limit the number of devices that can be operated at one time in the same area. If devices are generally permitted on an unlicensed basis, there will be no adequate means to limit the aggregate radiated power that is emitted within a given area to a reasonable level that achieves a balance between UWB and other interests. Therefore, it would appear that the adoption of a some type of blanket licensing procedure would enable the Commission better to exert the requisite control in this area and would provide current spectrum users with the critical information necessary to permit evaluation of the potential interference threat of a particular UWB application before it is deployed. As part of the licensing process, the FCC, applicants, and other spectrum users may be able to work together to ensure that appropriate mitigation techniques are identified to avoid harmful interference. For those frequencies where studies determine that there are no reasonable interference concerns for safety services, the Commission may be able to consider unlicensed operations.

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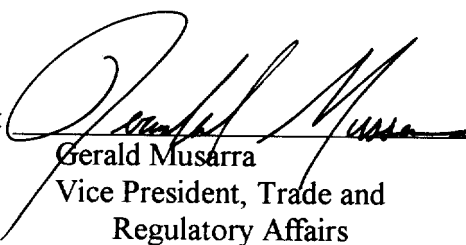
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<sup>17</sup> See, e.g., Sirius Comments at 20-21; GPS Council Comments at 23, 49-51.

<sup>18</sup> See MSSSI Comments at 12.

In sum, the Commission has an obligation as the government entity entrusted with management of the commercial spectrum to require comprehensive testing of any commercial technology before it is deployed in, or adjacent to, encumbered bands. Commenters representing all types of interests, including some UWB proponents, agree that UWB raises significant interference potential to the operation of existing services, and that such a careful approach is required. For this reason, the Commission should proceed with caution, awaiting full analysis of the test results that are forthcoming before allowing any further establishment of UWB technology, particularly in the bands below 3 GHz. Absent conclusive evidence to the contrary, the Commission should likely preclude these devices from operation in bands below 3 GHz in order to protect from harmful interference GPS and other sensitive services operating in bands currently restricted under Part 15. Moreover, in order to ensure the protection of existing services, the Commission should not employ Part 15 as a vehicle for regulating UWB devices, which should instead be regulated as services under some type of blanket licensing regime.

Respectfully submitted,

By:   
Gerald Musarra  
Vice President, Trade and  
Regulatory Affairs

October 27, 2000

Lockheed Martin Corporation  
Crystal Square 2, Suite 403  
1725 Jefferson Davis Highway  
Arlington, Virginia 22202  
(703) 413-5791